

PRESSURE MEASURING TESTS

SERIES B-BARCLAY

Brown and Williamson Tobacco Co.
1600 W. Hill St.
Louisville, Ky. 40201

Consultant's report prepared by
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Lip-Pressure Measuring Tests - Series B - Barclay

A second series of tests were conducted to measure the pressure exerted on a cigarette filter by human lips. The purpose of these tests (Series B) was to determine the pressure exerted on a Barclay filter, as opposed to the filter of a Rich Light which was tested in the first series (Series A).

In essence, the measurement method and test procedure were the same as in Series A, with the exceptions noted in Appendix A. A small water-filled bulb attached to the cigarette filter at the position of lip contact experiences a rise in internal pressure when exposed to the pressure acting external to the bulb. This pressure rise is measured by a low compliance pressure transducer and displayed on an oscilloscope.

The relationship between pressure applied to the bulb by a smoker's lips and the magnitude of the oscilloscope-trace deflection is calibrated using a device which simulates the action of human lips. The device employs a thin-walled latex tube which applies a variable (but measurable) level of pressure to the cigarette filter by means of inflation of the tube with air pressure. When the cigarette is being smoked we convert the oscilloscope reading to pressure, using this calibration relationship, to obtain a measure of lip-pressure.

The smokers were selected from a group of individuals who had previously served as panelists at the test facility operated by Brown & Williamson. Each was asked to smoke normally using a fresh Barclay

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cigarette instrumented as described above. The oscilloscope trace deflection produced with each puff was recorded by my colleague, Mark Johnson, seated in the same room as the smoker, and later converted to pressure using the calibration relationship. Typically ten puffs were recorded; five with the bulb positioned against the upper-lip, five with the bulb against the lower-lip. Whether the upper- or lower-lip was tested first was selected randomly during the two days of testing.

The test results were analysed in the same fashion as before yielding values for each smoker for: pressure exerted during lighting, p_L ; average upper-lip pressure, p_U ; and average lower-lip pressure, p_D . Overall averages (and standard deviation) were computed from the entire group of 17 subjects and an overall mean lip-pressure, \bar{p} was determined. The results are given in Table 1. All test data sheets are included in Appendix B.

It should be pointed out that in these tests, as in Series A, we encountered some problem in positioning the bulb so that it made good contact with the smoker's lips. At times during the test, it was apparent that the bulb was not against the lip. All such readings were disregarded. At other times, a low reading was observed, probably as a result of the bulb being near the inner or outer edge of the lip contact area. Since there was no consistent means of discriminating between these low measurements and those which were closer to the maximum lip-pressure, they were necessarily included in the analysis. The results therefore reflect an average of the pressure distribution along the lips, not a maximum.

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Judging from the distribution of readings obtained, however, it is clear that the maximum lip-pressure for any given individual is not more than about twice as large as the average values given in Table 1.

These results compare favorably with the measurements made during the first test series using Rich Lights:

<u>Series A</u>	<u>Series B</u>
$p_L = 55.0$ torr	25.1
$p_U = 43.7$	45.1
$p_b = 24.7$	28.8
$\bar{p} = 34.2$	35.2

Clearly there are no significant differences between the pressures exerted on the Rich Light and Barclay filters and therefore, all conclusions drawn from Series A still apply. Most importantly, the pressures exerted by human lips on the Barclay filter are most closely approximated by the Cambridge holder, currently used in the FTC test procedure. The filtrona holder, by contrast, exerts pressures which are about 15 times greater than normal lip-pressure.

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Table 1. Data Summary

Lip-pressures (in torr)

Subject	Upper-lip (p_u)	Bottom-lip (p_b)	Overall (\bar{p})	Lighting (p_L)
1	7.9	18.8	14.0	(a)
2	(calibration error)			
3	7.0	6.7	6.8	(a)
4	59.5	4.8	32.1	6.4 (b)
5	4.4	3.5	4.0	2.54 (b)
6	27.5	2.1	14.8	(a)
7	124	144	133	135 (c)
8	10.7	37.5	22.6	(a)
9	9.5	2.6	5.7	1.0 (b)
10	14.9	6.7	9.7	4.1 (b)
11	51.8	1.5	26.6	(a)
12	(bulb rupture)			
13	(bulb rupture)			
14	54.0	22.4	35.1	20.3 (b)
15	63.5	115	82.9	57.1 (c)
16	57.5	31.5	44.6	(a)
17	138	31.6	80.5	7.6 (b)
18	97.4	27.9	54.0	5.1 (b)
19	7.0	6.8	6.9	12.7 (c)
<hr/>				
Average \pm s.d. 45.8 \pm 43.1 29.0 \pm 41.4 35.8 \pm 36.1 25.1 \pm 41.9				

(a) Bulb not against lip

(b) Lighting with bulb against bottom-lip

(c) Lighting with bulb against upper-lip

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Appendix A

Modifications in the Apparatus and Test Procedure

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In the Series A tests, mounting the delicate sensing bulb onto the filter was found to be extremely time-consuming. Furthermore, mounting the bulb to the cigarette was a difficult task requiring a steady hand and no doubt contributed to some slight inconsistencies from one cigarette to the next.

To eliminate these problems in Series B the bulb was instead mounted on a 5/16" I.D. latex sleeve which could be easily mounted and, more importantly, re-used for several tests. It was also hoped that using the same sleeve would eliminate the need for separate calibrations on each cigarette. This proved not to be true, however, probably due to the influence on sensitivity of very slight differences in the placement of the latex sleeve on the filter.

In using the sleeve, we felt that there was no compelling reason to remove a portion of the filter paper as had been done in Series A prior to attaching the bulb. Since the filter paper represents a more rigid backing than the fibrous filter and yields less when load is applied, not removing the paper would tend to produce higher readings. In that the pressure levels in Series A and B are not significantly different, this appears to be a relatively minor effect.

We modified the test procedure in only one important respect. Due to the tendency of the channels in the Barclay filter to collapse and remain collapsed when subjected to the high calibration pressure, the calibration was conducted at the end of each test in Series B rather than at the beginning as in Series A. It was reasoned that, if the Barclay filter was altered in

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a systematic fashion prior to smoking, that this might lead to changes in the smoker's normal draw and, hence, his or her normal lip-pressure.

In all other respects, the test apparatus and procedure were the same as described in the Series A Final Report.

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Appendix B
Test Results

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Test Data Sheet

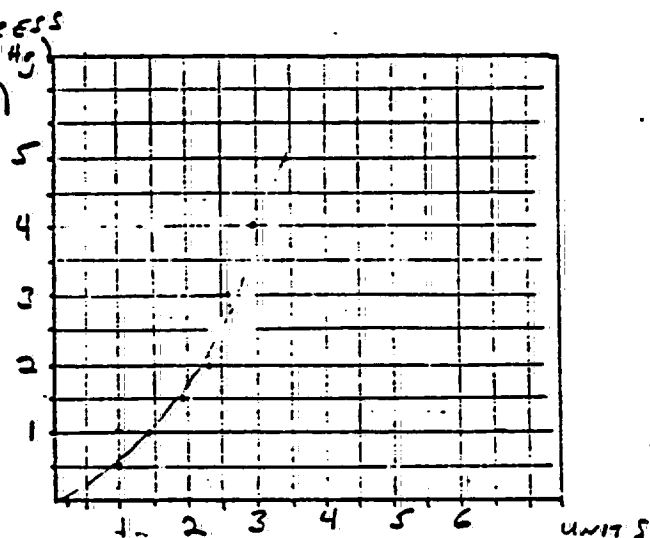
Date 8/31 Time 9:30 ^{9 AM} Subject # 1 Sex F
 Weight _____ Height _____

Comments _____

CALIBRATION

Pressure (in Hg)	Output voltage (mV)
0	0.2
0.5	1.0
1.0	1.4
1.5	1.9
2.0	2.3
3.0	2.6
4.0	2.9
5.0	3.4
6.0	3.6
7.0	3.8
8.0	4.0
9.0	4.2
10.0	4.5

TEST RESULTS



Measurement

Maximum scale reading

Photograph

UP

LIGHTING

1	0.4	0	0
2	1.2	0.8	0.45
3	0.9	0.5	0.20
4	1.0	0.6	0.25
5	1.1	0.7	0.35
6	1.6	1.2	0.7
7	1.8	1.4	1.0
8	1.1	0.7	0.35
9	1.9	1.5	1.1
10	1.4	1.0	0.55

BOTTOM

2.15 ± 4.6

Test comments:

CIGARETTE TO FAR INTO
 MOUTH (SHE SAID)
 ZERO WAS ABOUT 0.4 WHILE
 SHE HELD CIGARETTE

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Test Data Sheet

no lubrication

Date 8/31 Time 10:00 Subject # 2 Sex F

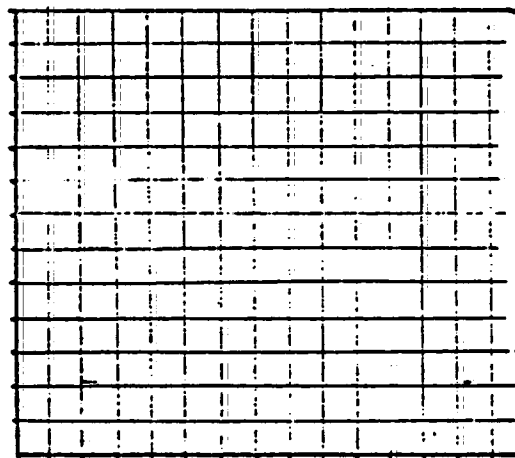
Weight _____ Height _____

Comments SHE REALLY SUCKED HARD IN THE BEGINNING (BOTH CHEEKS WENT IN)

CALIBRATION SAME AS #1

Pressure Output voltage

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____



TEST RESULTS

LIGHTING
UP

Position

Measurement #

Maximum scale reading

Photograph

1
2
3
4
5
6
7
8
9
10

4.2
9.0
8.5
2.1
2.2
0.6
3.3
2.4

Test comments:

BASLINE
0.5

CALIBRATION WAS
ASSUMED NOT TO
HAVE CHANGED FROM
#1; THIS MAY HAVE
BEEN A BAD ASSUMPTION

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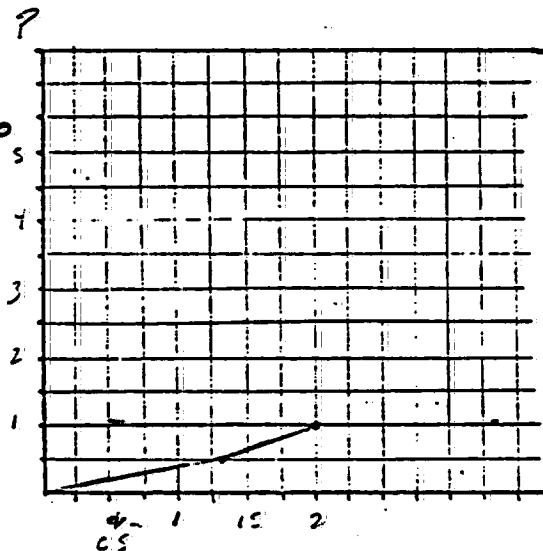
Test Data Sheet

Date 8/31 Time ^{10:30}(10:45) Subject # 3 Sex F
Weight Height

Comments

CALIBRATION

Pressure (in. Hg)	Output voltage (V)
0	0.5
0.5	1.0
1.0	1.5
1.5	2.0
2.0	2.6
3.0	3.3
4.0	4.3
5.0	4.9



TEST RESULTS

	Measurement #	Maximum scale reading	Photograph	
LIGHTING TOP	1	0.5	0.5	0.05
	2	0.8	0.8	0.15
	3	1.3	1.3	0.4
	4	1.3	1.3	0.4
BOTTOM	5	0.75	0.75	0.15
	6	1.0	1.0	0.25
	7	1.0	1.0	0.25
	8	0.8	0.8	0.2
	9	1.1	1.1	0.35
	10			

Test comments:
DASELVE
0.4

PACIFIC
C-3

CALIBRATION DONE
WITH CIGARETTE
AFTER TEST

2023100064

Test Data Sheet

Date 8/21 Time 11:15 Subject # 4 Sex F

Weight _____ Height _____

Comments _____

CALIBRATION

Pressure (in Hg)

0.0

0.5

1.0

1.5

2.0

3.0

4.0

5.0

6.0

7.0

TEST RESULTS

8.0

Output voltage

0.0

0.5

1.0

1.5

2.0

3.0

4.0

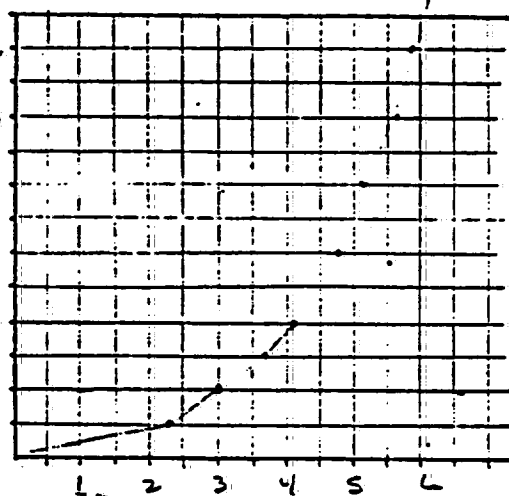
5.0

6.0

7.0

8.0

Redo



Measurement #

Maximum scale reading

Photograph

BOTTOM

1 LIGHTING

2

3

4

TOP

5

6

7

8

9

10

1.2

1.0

1.0

0.7

2.1

6.5

2.0

2.8

0.3

0.25

0.25

0.2

0.4

8.0

0.4

0.8

0.25

0.20

0.20

0.10

0.35

8.0

0.25

0.65

Test comments:

BASELINE
AFTER PRODUCE
AFTER TEST
0.3

CALIBRATION
AFTER TEST

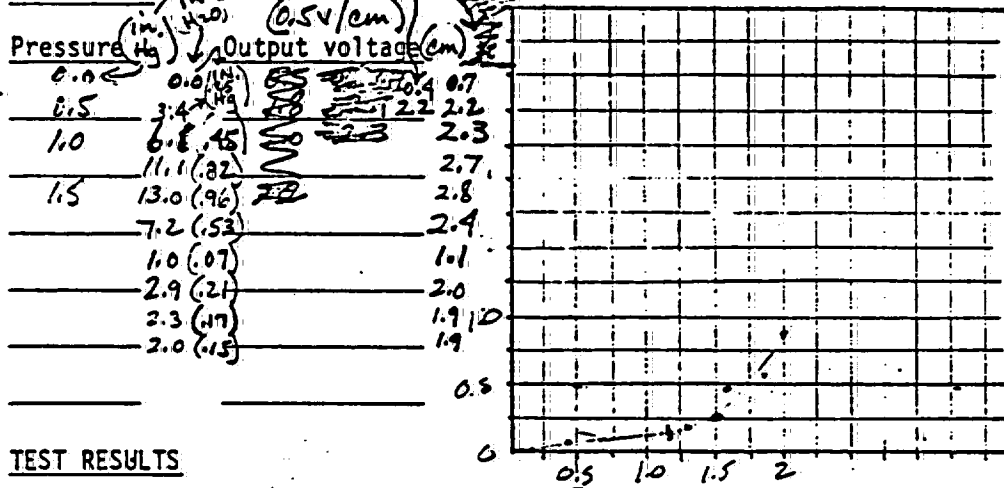
2023100065

Test Data Sheet

Date 4 Time 12 Subject # 5 Sex M
 Weight _____ Height _____

Comments _____

CALIBRATION



TEST RESULTS

	Measurement #	Maximum scale reading	Photograph
BOTTOM	1 LIGHTING	0.7	0.10
	2	1.0	0.15
	3	0.9	0.15
	4	1.0	0.15
TOP	5	1.5	0.25
	6	1.1	0.15
	7	1.0	0.15
	8	1.0	0.15
	9		
	10		

Test comments:

BASELINE WHEN
HOLDING CIGARETTE

0.3

CALIBRATION DONE
AFTER TEST
(CIGARETTE FILTER WAS MASHEE
DOWN BY SMOKE)

2023100066

Test Data Sheet

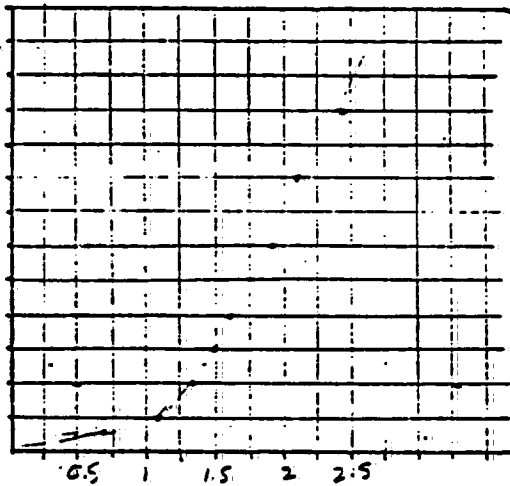
Date 8/31 Time 1:50 Subject # 6 Sex F

Weight _____ Height _____

Comments NEW PULB ; IT IS A
LITTLE FLATTER

CALIBRATION

Pressure ⁱⁿ Hg	0.5v/cm Output voltage (cm)
0.0	0.1
0.5	1.2
0.25	0.8
1.0	1.4
1.5	1.6
2.0	1.7
3.0	2.0
4.0	2.2
5.0	2.5
6.0	2.6



TEST RESULTS

	Measurement #		Maximum scale reading	Photograph
BOTTOM	1	LIGHTING	0.3	0
	2		0.4	0.03
	3		0.8	0.08 0.08
	4		1.0	0.12
	5		0.8	0.08
TOP	6		0.8	0
	7		1.0	0.08
	8		2.2	1.25
	9		2.5	2.0
	10		2.0	1.0

Test comments:

BASELINE
0.3

BASELINE
0.6

BASELINE
0.8

CALIBRATION
DONE
AFTER TEST

2023100067

Test Data Sheet

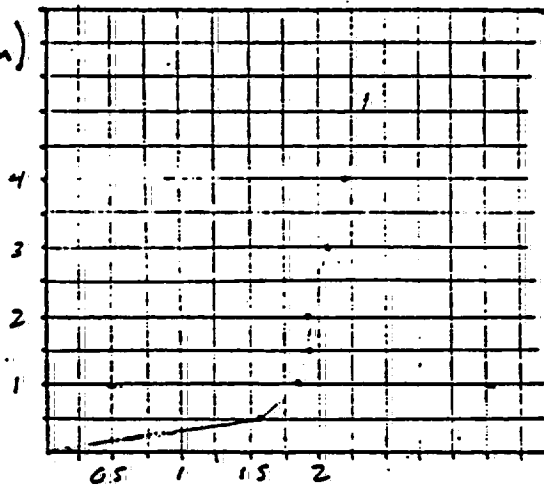
Date 8/31 Time 3:45 Subject # 8 Sex M

Weight _____ Height _____

Comments CIGARETTE SEERED TO
COMPRESS A LITTLE DURING CALIBRATION

CALIBRATION

Pressure (in Hg)	(0.50/cm)	Output voltage (cm)
0.0	1.7	0
0.5	3.3	1.6
1.0	3.5	1.8
1.5	3.6	1.9
2.0	3.6	1.9
3.0	3.8	2.1
4.0	3.9	2.2
5.0	4.0	2.3



TEST RESULTS

Measurement #	Maximum scale reading	Photograph
TOP 1	2.2 1.3	0.4
2	2.2 1.3	0.4
3	1.9 1.0	0.3
4	2.4 1.5	0.5
5	2.4 1.5	0.5
BOTTOM 6	7.2 1.0	0.3
7	4.2 2.0	2.3
8	4.2 2.0	2.3
9	4.2 1.9	1.0
10		

Test comments:

BASELINE BASELINE BASELINE
0.9 2.2 2.4

CALIBRATE
AFTER
TEST

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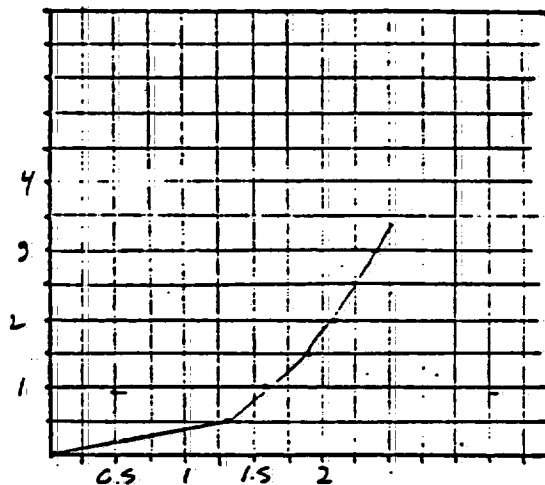
Test Data Sheet

Date 8/21 Time 5:00 Subject # 9 Sex M
 Weight _____ Height _____

Comments _____

CALIBRATION

Pressure	Output voltage	
<u>0</u>	<u>.1</u>	<u>0</u>
<u>.5</u>	<u>1.4</u>	<u>1.3</u>
<u>1.0</u>	<u>1.7</u>	<u>1.6</u>
<u>1.5</u>	<u>2.0</u>	<u>1.9</u>
<u>2.0</u>	<u>2.2</u>	<u>2.1</u>
<u>3.0</u>	<u>2.5</u>	<u>2.4</u>
<u>4.0</u>	<u>2.7</u>	<u>2.6</u>
_____	_____	_____
_____	_____	_____



TEST RESULTS

BOTTOM

Measurement #	Maximum scale reading		Photograph
1 LIGHTING	<u>0.2</u>	<u>0.1</u>	<u>0.04</u>
2	<u>0.3</u>	<u>0.2</u>	<u>0.08</u>
3	<u>0.3</u>	<u>0.2</u>	<u>0.08</u>
4	<u>0.6</u>	<u>0.5</u>	<u>0.20</u>
5	<u>0.4</u>	<u>0.3</u>	<u>0.12</u>
6	<u>0.8</u>	<u>0.7</u>	<u>0.28</u>
7	<u>1.4</u>	<u>1.3</u>	<u>0.5</u>
8	<u>1.0</u>	<u>0.9</u>	<u>0.36</u>
9	<u>1.0</u>	<u>0.9</u>	<u>0.36</u>
10	_____	_____	_____

TOP

Test comments:

BASELINE DURING
TEST
0.1

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Test Data Sheet

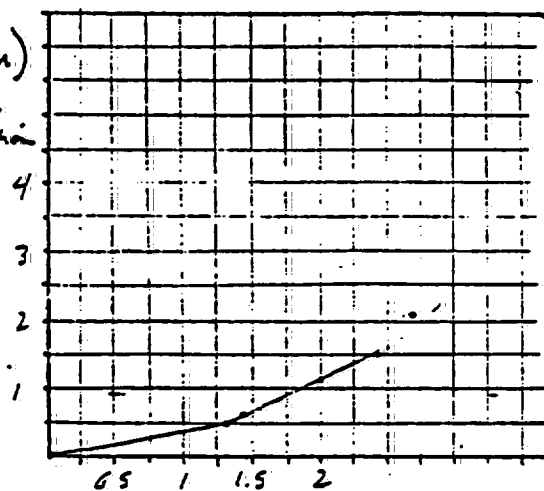
Date 9/1 Time 9:15 Subject # 10 Sex M

Weight _____ Height _____

Comments STILL USING SAME BULB
FROM LAST NIGHT

CALIBRATION

Pressure (in Hg)	(0.5v/cm) Output voltage (cm)
0.0	0.0 (0.1)
0.5	1.3
0.6	1.4
1.1	2.0
1.5	2.4
2.1	2.7
2.4	2.8
2.8	2.9
6.0	3.7



TEST RESULTS

Measurement #		Maximum scale reading	Photograph
BOTTOM	1 LIGHTING	0.5 0.4	0.16
	2	0.2 0.4	0.04
	3	0.3 0.2	0.09
	4	1.4 1.2	0.45
	5	0.5 0.4	0.16
	6	1.65 1.55	0.7
TOP	7	1.6 1.6	0.75
	8	1.6 1.7	0.8
	9	0.7 0.9	0.32
CALIBRATION	10	0.8 0.9	0.36

Test comments:

BASELINE
0.1

BASELINE
0.0

BASELINE
-0.1

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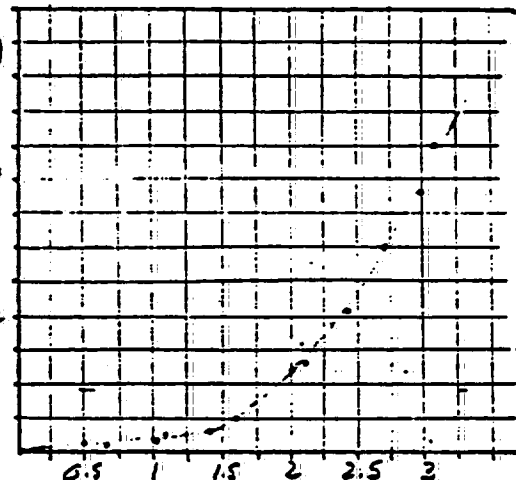
Test Data Sheet

Date 9/1 Time 10:00 Subject # 11 Sex F
 Weight _____ Height _____

Comments _____

CALIBRATION

Pressure $\frac{\text{in}}{\text{Hg}}$	Output voltage (cm)
0.0	0.3 0
0.3	1.7 1.4
0.2	1.4 1.1
0.1	1.3 1.0
0.05	1.0 0.7
0.0	2.4 2.1
1.3	2.3 2.0
1.2	1.9 1.6
0.5	2.7 2.4
2.1	3.0 2.7
3.0	3.4 3.1
4.5	3.3 3.0
5.8	



TEST RESULTS

Measurement #	Maximum scale reading	Photograph
TOP		
1 LIGHTING →	0.2 0	0
2	2.5 2.3	1.9
3	2.0 1.8	0.8
4	3.2 3.0	3.9
5	2.4 2.2	1.55
BOTTOM		
6	0.7 0.5	0.05
7	1.3 0.9	0.08
8	1.0 0.6	0.055
9	0.8 0.4	0.015
10		

CALIBRATION

DONE

APPROX

TEST

Test comments:

CALIBRATION

0.2

0.4

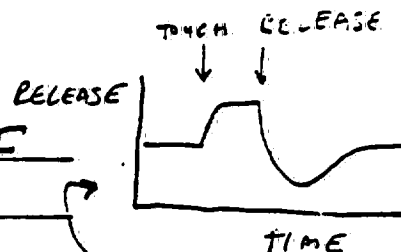
2023100072

X
burnt tube

Test Data Sheet

Date 9/1 Time 10:30 Subject # 12 Sex F
Weight _____ Height _____

Comments _____



CALIBRATION

Pressure (in Hg)	Output voltage (cm)
0.0	0.0 (0.4) Tube touching
0.3	1.2
0.2	1.0
0.1	0.8
1.7	1.3
1.3	1.2
0.6	1.0
0.3	1.3
1.2	

Peaked out at 1.3 cm, even at 12 in Hg

TEST RESULTS

Measurement #	Maximum scale reading	Photograph
BOTTOM		
1 LIGHTING	1.0	
2	1.5	
3	2.2	
4	1.5	
5	0.5	
6	0.5	
TOP	1.6	
7	CIGARETTE BURNED	
8	TUBING	
CALIBRATION	RESPONSE CURVE	
DON C	TO TOUCHING SILE	
37 70.0		
1.0		

Test comments:

0.0

Tube rupture, probably
from calibration pressure
at burnt section of tubing
2023100073

Test Data Sheet

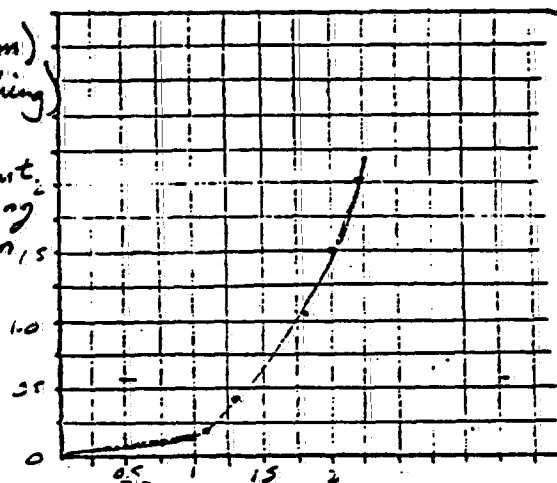
Date 9/1 Time 11:15 Subject # X Sex M
 Weight _____ Height _____

Aspirin, decided not to incl
 in data set because participat
 in previous test (WITH
 ROGE

Comments NEED TO FIND OUT SUBJECT #
FROM FIRST TEST SET

CALIBRATION

Pressure (in Hg)	Output voltage (cm)	
0.0	0.2 (0.4 touching)	
0.4	1.3 1.5	
0.2	1.1 1.3	
1.05	1.8 2.0	without sucking
1.5	2.0 2.2	down, 15
2.0	2.2 2.4	
2.6	2.4 2.6	



Subject →
 continuous drift
 down - probably
 insert and tube in

TEST RESULTS

block test. Measurement #

Prior calibration points OK.

TOP

Measurement #	Maximum scale reading	Photograph
1	2.1 2.1	1.7
2	1.8 1.8	1.05
3	0.9 0.9	0.75
4	1.2 1.2	0.30
5	1.7 1.7	0.95
6	0.5 0.3	0.1
7	0.5 0.3	0.1
8	0.5 0.3	0.1
9	0.4 0.1	0.05
10	0.5 0.2	0.05

BOTTOM

CALIBRATION

DONE

AFTER

TEST

Test comments:

BASELINE

0.2

BASELINE

0.0

2023100074

Test Data Sheet

Date 9/1 Time 11:45 Subject # 13 Sex F

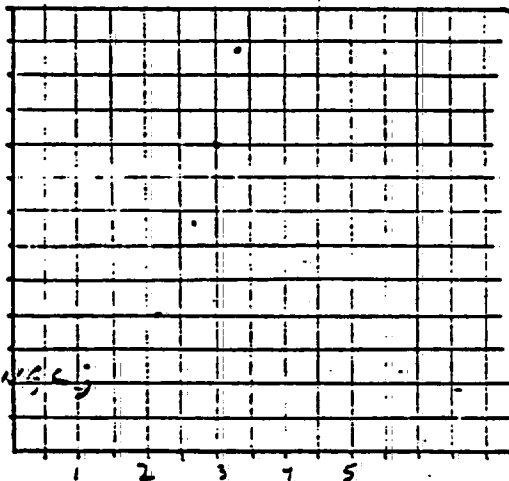
Weight _____ Height _____

Comments SHE REALLY CLAMPS DOWN!
Teeth definitely on bulb

CALIBRATION

Pressure (In Hg)	(0.5v/cm) Output voltage (cm)
0.0	0.0
0.1	0.2
0.6	1.6
1.1	1.7
2.0	2.1
3.3	2.7
4.5	3.0
5.9	3.3

LOST CALIBRATION SIGNAL;
SEEM TO BE BULL
TEST RESULTS



	Measurement #		Maximum scale reading	Photograph
UP	1	LIGHTING →	4.5 4.5	
	2		4.5 4.5	
	3		4.0 4.0	
	4		3.5	
	5		3.5	
BOTTOM	6	→	1.1	
	7		4.0	
	8	→	4.0	
CALIBRATION	9		1.0	
DONE	10			
AFTER				
TEST				

Test comments:

BASLINE
0.0

BASLINE
0.3

2023100075

Test Data Sheet

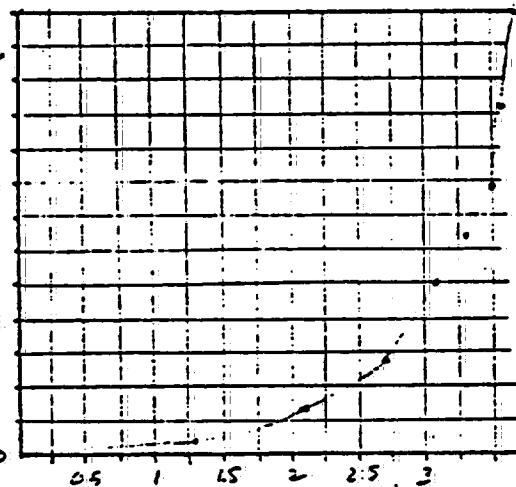
Date 9/1 Time 12:40 Subject # 14 Sex F

Weight _____ Height _____

Comments NEW BULB

CALIBRATION

Pressure $\frac{In}{Hg}$	Output voltage (cm)
0.0	0.0 (0.3 Touching)
0.2	1.3
0.65	2.1
1.4	2.7
2.5	3.1
2.2	3.3
3.9	3.5
5.1	3.6
6.4	3.8



TEST RESULTS

Measurement #		Maximum scale reading	Photograph
BOTTOM	1 LIGHTING	2.4	2.3
	2	2.1	2.3
	3	2.5	2.6
	4	2.5	2.4
	5	2.6	2.4
TOP	6	2.9	2.5
	7	3.2	2.8
	8	2.7	3.1
CALIBRATION	9	3.4	2.6
AFTER	10		3.3
TEST	Test comments:		
	<u>BASELINE</u>	<u>BASELINE</u>	
	0.1		

2023100076

Test Data Sheet

Date 9/1 Time 1:30 Subject # 15 Sex M

Weight _____ Height _____

Comments _____

CALIBRATION

Pressure (in Hg)

(0.5V/cm)

Output voltage (mV)

0.0

0.0 (0.7)

0.5

1.8

0.25

1.6

1.2

2.4 without

1.75

2.7 suction

2.2

3.0

3.0

3.2

3.8

3.4

4.4

3.5

4.8

3.6

5.3

3.6

6.2

3.7

TEST RESULTS

7.6

3.9

8.5

4.0

9.5

4.1

10.7

4.1

2

4.1

3

4.1

4

4.1

5

4.1

6

4.1

7

4.1

8

4.1

9

4.1

10

4.1

Maximum scale reading

Photograph

2.0

2.9

2.25

2.0

2.9

2.25

2.4

3.3

3.5

3.0

2.9

2.25

2.0

2.9

2.25

3.4

3.3

3.5

3.9

3.9

7.0

3.2

3.2

3.1

2.0	2.9
2.0	2.9
2.4	3.3
3.0	2.9
2.0	2.9
3.4	3.3
3.9	3.9
3.2	3.2

2.25
2.25
3.5
2.25
2.25
3.5
7.0
3.1

Test comments:

2.0-3.0 2.0-3.0
0.1

2023100077

Test Data Sheet

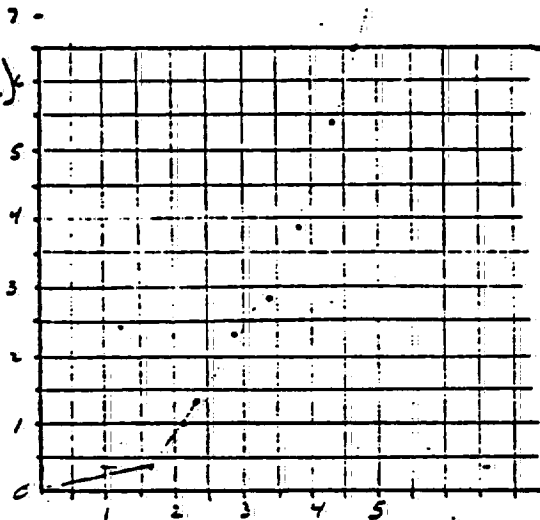
Date 9/1 Time 3:10 Subject # 17 Sex M

Weight _____ Height _____

Comments _____

CALIBRATION

Pressure ($\frac{In}{kg}$)	(0.5V/cm)	Output voltage (cm)
0.0	-0.1 (0.0)	0
1.0	2.0	2.1
0.3	1.5	1.6
1.3	2.2	2.3
2.3	2.8	2.9
2.8	3.3	3.4
3.9	3.7	3.8
5.4	4.2	4.3
6.5	4.6	4.7
7.5	4.8	4.9



TEST RESULTS

	Measurement #		Maximum scale reading	Photograph
BOTTOM	1	LIGHTING	1.3	0.3
	2		1.3	0.3
	3		1.3	0.3
	4		0.9	0.2
	5		2.6	1.7
	6		2.4	1.4
	7		4.0	4.5
TOP	8		3.2	2.7
	9		4.0	4.5
CALIBRATE	10		4.8	7.0
AFTER			4.6	6.4
TEST			4.6	6.4
			4.4	5.5
		BASELINE		
		0.0		

2023100078

Test Data Sheet

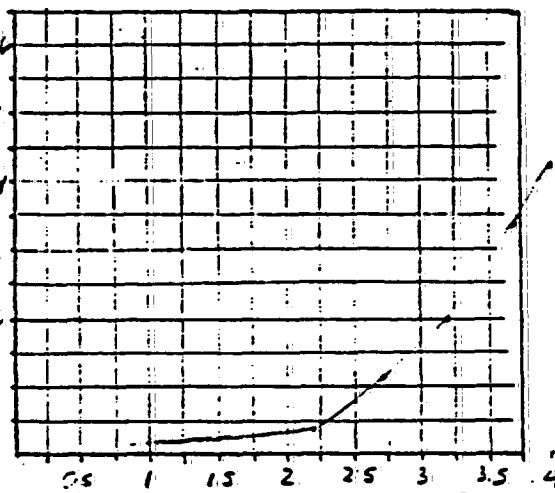
Date 9/1 Time 3:45 Subject # 18 Sex F

Weight _____ Height _____

Comments _____

CALIBRATION

Pressure (In Hg)	Output voltage (cm)
0.0	0.0 (0.8)
0.4	2.2 2.3
1.1	2.7 2.8
2.0	3.2 3.3
3.3	3.7 3.8
4.2	4.0 4.1
4.6	4.1 4.2
5.6	4.2 4.4
6.4	4.5 4.6
7.9	4.7 4.8



TEST RESULTS

	Measurement #	Maximum scale reading	Photograph
BOTTOM	1	1.6 1.3	0.2
	2	2.0 2.7	1.1
	3	2.5 2.2	0.4
	4	4.0 3.7	3.3
	5	2.6 2.3	0.5
TOP	6	4.0 3.7	3.3
	7	4.2 3.9	4.1
	8	4.2 3.9	4.1
CALIBRATION	9		
AFTER	10		
TEST			

Test comments:

BASALINE

0.3

2023100079

Test Data Sheet

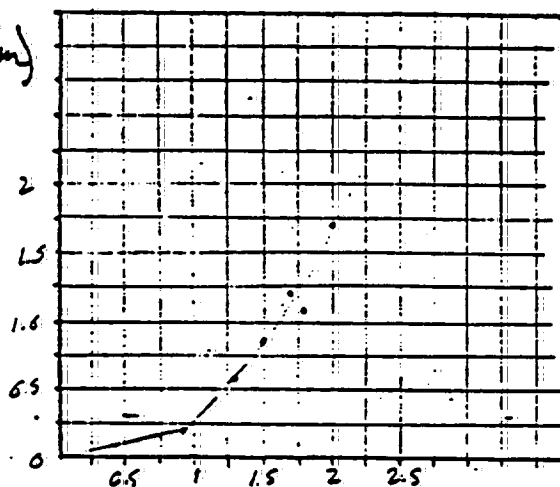
Date 9/1 Time 4:25 Subject # 19 Sex M

Weight _____ Height _____

Comments _____

CALIBRATION

Pressure (μg)	Output voltage (cm) (0.5V/cm)
0.0	0.0
0.2	0.9
0.6	1.3
1.2	1.7
1.8	2.0
2.9	2.6
1.1	1.8
0.85	1.5



TEST RESULTS

Measurement #	Maximum scale reading	Photograph
TOP		
1 LIGHTING	1.4 1.2	0.5
2	0.8 0.6	0.25
3	0.6 0.4	0.2
4	0.5 0.3	0.18
5	0.8 0.6	0.25
BOTTOM		
6	1.0 0.8	0.3
7	0.8 0.6	0.25
8	1.2 0.8	0.3
9	0.9 0.5	0.22
10		
CALIBRATE		
AFTER		
TEST		
Test comments:		
BASELINE	BASELINE	
0.2	0.4	

2023100080

Test Data Sheet

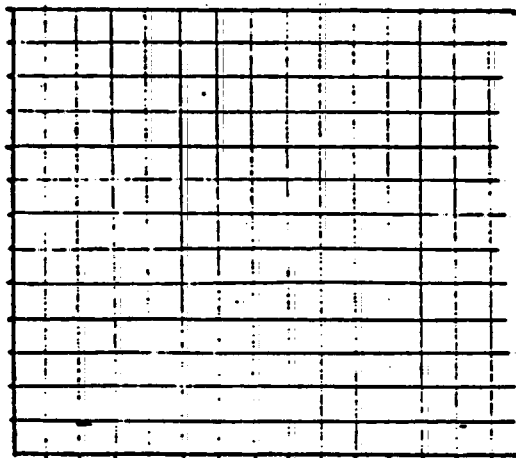
Date 9/1 Time 5:30 Subject # FILTERONA Sex

Weight Height

Comments SUCTION, THEN INSERT,
THEN RELEASE SUCTION.

CALIBRATION

<u>Pressure</u>	<u>Output voltage</u>
<u>0</u>	<u>0.0</u> (0.0)
<u>1.3</u>	<u>3.8</u>
<u>1.5</u>	<u>3.3</u>
<u>2.5</u>	<u>4.5</u>
<u>3.5</u>	<u>4.9</u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>



TEST RESULTS

<u>Measurement #</u>	<u>Maximum scale reading</u>	<u>Photograph</u>
<u>1</u>	<u>5.1</u>	<u> </u>
<u>2</u>	<u>5.0</u>	<u> </u>
<u>3</u>	<u>4.7</u>	<u> </u>
<u>4</u>	<u>4.9</u>	<u> </u>
<u>5</u>	<u> </u>	<u> </u>
<u>6</u>	<u> </u>	<u> </u>
<u>7</u>	<u> </u>	<u> </u>
<u>8</u>	<u> </u>	<u> </u>
<u>9</u>	<u> </u>	<u> </u>
<u>10</u>	<u> </u>	<u> </u>

Test comments:

WRONG TURNING! ON
FILTERONA HOLDER

2023100081

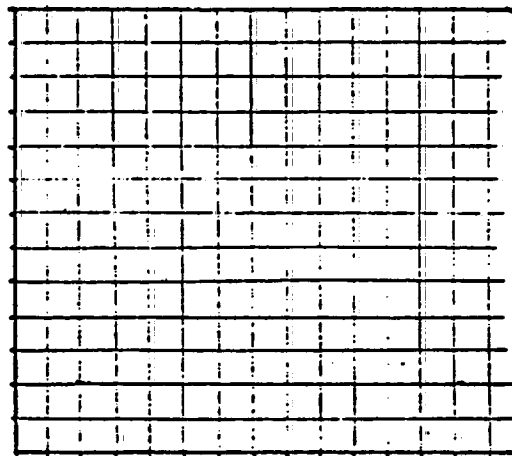
Test Data Sheet

Date 9/1 Time 2:30 Subject # BORGWALDT Sex
 Weight Height

Comments INSECT ALL THE WAY THROUGH,
THEN SLOWLY PULL BACK

CALIBRATION

Pressure ^{In} Hg	Output voltage
0.0	0.0 (0.3 Touch)
0.3	0.9
0.2	0.7
0.75	1.0 without
1.1	1.1 suction
1.9	1.1
2.4	1.2
2.8	1.25
3.3	1.3
3.6	1.35
4.0	1.35
4.9	1.4



TEST RESULTS

6.0	1.4
8.3	1.45
Measurement #	1.5
10.2	1.5 first
11.2	pass
2	
3	
4	
5	
6	
7	second
8	pass
9	
10	

CALIBRATE
 AFTER
 TEST

Test comments:

third
 pass
 (cigarette
 rotated)

Maximum scale reading

1.3
1.3
1.2
1.3
1.3
1.2
1.2
1.3
1.2
1.3

Photograph

USE
 PEAK
 OF
 EACH
 RUN

NOTE: VALVE
 TO SYRINGE
 WAS OPEN (BUT
 NOT TO ATMOSPHE
 THIS WAS CAUSE
 OF LOWERED
 FLUXIVITY!

2023100082

Test Data Sheet

Date 8/21 Time 4:30 Subject # CAMB. #1 Sex

Weight _____ Height _____

Comments BULB FLATTENED OUT DURING
CALIBRATION

CALIBRATION

CALIBRATION	
Pressure (kg)	Output voltage (cm)
0.0	0.1
0.5	0.8
1.0	1.0
1.5	1.1
2.0	1.2
2.5	1.3
3.0	1.3
3.5	1.4
4.0	1.5
5.0	1.6
6.0	1.5
7.0	

[illegible]

TEST RESULTS

Measurement #	Maximum scale/reading	Photograph
1 CAMERIOGE	1.5	
2	1.6	
3	1.4	
4	1.4	
5	1.3	
6	1.6	
7	1.6	
8	1.7	
9	1.7	
10		

CALIBRATE
AFTER
TEST

Test comments:

PUSHING CIGARETTE
INTO HOLDER (TO GET
READING)

2023100083

Test Data Sheet

Date 8/31 Time 5:30 Subject # CMB Sex _____
Weight FILTER Height H. LOER

Comments PUSHING CIGARETTE
INTO HOLE (TO GET READING)

CALIBRATION *Exch. .3 %*

Pressure	Output voltage
0	.3
.5	1.4
1.0	1.6
1.5	1.8
2.0	2.0
2.25	2.3
4.1	2.5
5.2	2.6
6.5	2.8
8.1	3.1
10.1	3.3
11.0	3.4
12.1	3.5

[illegible]

TEST RESULTS

Measurement #	Maximum scale reading	Photograph
1	3.0	
2	2.2	
3	3.4	
4	3.3	
5	3.5	
6		
7		
8		
9		
10		

CALIBRATE
AFTER
TEST

Test comments: CHANGED TO NEW
BULL BEFORE THIS TEST

2023100084

CANERIDGE

Weight _____ Height _____

Comments _____

Pressure:	Output voltage
0	.1
.4	.3
1.4	1.0
2.2	1.4
3.4	1.9
4.5	2.3
6.2	3.6

[illegible]

Measurement #	Maximum scale reading	Photograph
1	2.2	
2	2.0	
3	2.0	
4	2.2	
5		
6		
7		
8		
9		
10		

CALICRATE

3776 K
78-57

Test comments: ALL THE WAY IN, BUT TAKE
VALUE @ THE RING, NOT
THE MAXIMUM WHICH OCCURS
ALL THE WAY IN

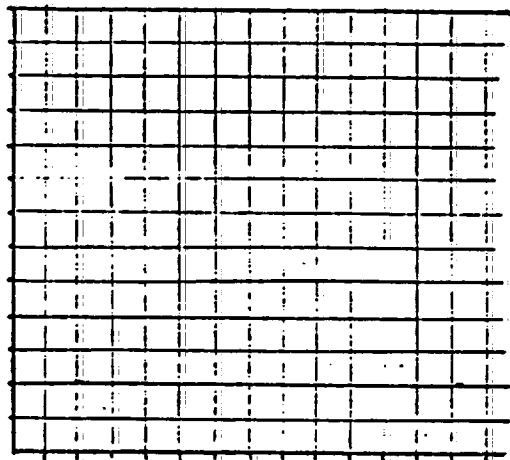
2023100085

Test Data Sheet

Date _____ Time 6:30 Subject # FILTERONA Sex _____
Weight _____ Height _____
Comments _____

CALIBRATION

Pressure	Output voltage
<u>0</u>	<u>1.2</u>
<u>1.1</u>	<u>1.6</u>
<u>1.9</u>	<u>2.1</u>
<u>4.1</u>	<u>2.7</u>
<u>5.9</u>	<u>3.0</u>
<u>9.3</u>	<u>3.4</u>
<u>10.6</u>	<u>3.5</u>
<u>12.1</u>	<u>3.6</u>
<u>15.0</u>	<u>3.7</u>
<u>19.0</u>	<u>3.8</u>
<u>21.2</u>	<u>3.9</u>
<u>24.6</u>	<u>4.0</u>



TEST RESULTS

Measurement #	Maximum scale reading	Photograph
1	<u>3.8</u>	_____
2	<u>3.9</u>	_____
3	* <u>3.8</u>	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____

CALIBRATE
AFTER
TEST

Test comments:

* LAST CONNECTION; RECONNECT
(UNDER WATER) BEFORE THIS
READING.

2023100086